a resin having a functional group, and

a cross-linking agent reactive with said functional group of said resin, and

a color effect-providing pigment comprising;

a pigment substrate having first and second substantially parallel and planar surfaces, and

an inorganic coating disposed on at least one of said first and second substantially parallel and planar surfaces of said pigment substrate (B)(I), said inorganic coating (B)(II) having an index of refraction of 1.8 or less,

wherein the color effect-providing pigment is impact bonded with the powder-based binder,

wherein said inorganic coating (B)(II) and said pigment substrate (B)(I) of said color effect-providing pigment (B) interact with said first color effect of said substrate to produce said second color effect upon application of the film layer of the powder-based coating composition to the substrate.

Remarks

Upon entry of the present amendment claims 1-32 remain in the application. Claim 21 is canceled without prejudice.

Claims 1-8, 10-11, 15-26 and 28-32 are rejected under 35 USC 103(a) as unpatentable over Schmid et al., US Patent No. 5,958,125, (Schmid) in view of Clark et al., US Patent No. U.S. 5,552,487, (Clark). Schmid was cited as teaching goniochromatic luster pigments based on multiply coated, non-metallic, platelet-shaped substrates that are at least partially transparent to visible light. The pigment comprises a non-metallic substrate, a first coating having a refractive index less than or equal to

1.8, a 2nd reflecting, non-selective or selectively absorbing coating that is partially transparent to visible light and an optional outer protective layer. Schmid was cited for teaching that depending on the composition of the pigment platelets, interference, reflection and absorption phenomena create angle dependent color and lightness effects. The office action states that therefore mode of interaction between the pigment and the substrate onto which it is ultimately coated is a results effective variable.

Clark, et al. was cited for teaching a method for coating a metal substrate with a thermosetting powder composition. The powder may be pigmented or clear and is preferably applied over cured electrocoat. The powder coating includes a polymeric resin, a suitable cross-linking agent and a flow control agent. The Clark reference was cited as teaching the addition of a flow control agent for improved film smoothness. It was stated that it would have been obvious to one of ordinary skill in the art to incorporate luster pigment as taught by Schmid into a powder coating as taught by Clark. The office action stated that the motivation to combine the references was the marked improvement in film smoothness and angle dependent color and lightness effects of the resultant film coating that one would expect to gain as a result.

Claims 13 and 14 were rejected under 35 USC §103(a) as being unpatentable over Schmid et al. as modified by Clark et al. as set forth above and further in view of Suzuki et al., Japanese patent no. JP 8268345 (Suzuki). Suzuki was cited for teaching an interference pigment that comprises stainless steel flake coated with titanium dioxide and titanium dioxide hydrate. Suzuki was further cited for teaching that interference pigment can be dispersed into a resin such as an epoxy, polyester or acrylic to form paint. The office action stated that even though the Suzuki reference discloses only coating the substances with a high index material such as titanium dioxide, this does not preclude coating these substrates with lower index materials. It was further stated that Suzuki and Schmid teach the manufacture of similar compounds, namely interference pigments that have metallic luster. The office action concluded that it would have been obvious to use the stainless steel flakes disclosed by Suzuki as the pigment substrate for the metallic luster pigment composition described by Schmid et al. as modified by Clark.

The office action further stated that coating compositions resulting from the combination of Clark and Schmid would inherently meet the CIE Lab color space limitations defined in claim 21.

Applicants distinguish the instant claims over the cited references for the reason that none of the references specifically address the problems of obtaining good color shift from an effect pigment in a powder coating compositon. In coatings such as those taught in Clark, the pigment is a white pigment or a black pigment. Aluminum and effect pigments are not described or defined. Suzuki was directed to the use of a titanium dioxide coated stainless steel pigment in a liquid coating composition, not a powder. Accordingly, Schmid does not address the problems of obtaining good appearance from an effect pigment in a powder coating. Schmid generally states that the pigment may be used in coatings, but does not distinguish between powder and liquid coatings.

Generally in a liquid coating composition, a metallic pigment such as aluminum or an effect pigment is successfully utilized with no additional pigment treatment. This is because the coating contains some solvent, (solvent can mean water) and the solvent volatilizes and the film shrinks upon heating to facilitate optimum pigment orientation. In a powder coating there is no solvent and the film does not shrink upon curing. Thus the pigment does not obtain an optimum orientation. Color shift and color travel are compromised because alignment of the pigment is random where there is no film shrinkage or solvent evaporation. This is demonstrated, for example, where a pigment such as aluminum flake is used in powder and a battleship gray color results instead of a shiny silver appearance, or in the case of the effect pigment of the present invention where no color travel is obtained and a dull monochromatic color results.

Applicants submit that the references do not suggest the unexpected result of obtaining a powder coating containing the effect pigments of the present invention that provides good color travel and a bright appearance upon curing. For this reason Applicants submit that the instant claims are patentable over the prior art.

Applicants have obtained good color travel and bright appearance by bonding the pigment and powder binder. This is set forth in the amended claim. Applicants traverse the rejection in view of the amendments to the claims requiring that

the color effect-providing pigment is impact bonded with the powder-based binder and such impact bonded powder based binder and color effect pigment is not taught in the cited prior art. Support for the amendment to the claim is found on page 16, paragraph no. 38. The impact bonding is required to provide the optically variable effect of the coating composition. Applicants submit that the powder coatings comprising the pigments defined in the instant claims that are not impact bonded do not provide the optically variable effect of the pigments that are impact bonded.

Applicants therefore request consideration and allowance of the amended claims.

Respectfully submitted,

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Claims with Markings to Show Changes

1. (Twice Amended) A coating system comprising:

a substrate having a first color effect; and

a film layer that is at least partially-transparent to visible light and is applied on said substrate for producing a second color effect different from said first color effect of said substrate wherein said film layer is the reaction product of a curable, powder-based coating composition comprising;

a powder-based binder comprising the reaction product of,

a resin having a functional group, and

a cross-linking agent reactive with said functional group of said resin, and

a color effect-providing pigment comprising;

a pigment substrate having first and second substantially parallel and planar surfaces, and

an inorganic coating disposed on at least one of said first and second substantially parallel and planar surfaces of said pigment substrate (B)(I), said inorganic coating (B)(II) having an index of refraction of 1.8 or less,

<u>wherein the color effect-providing pigment is impact bonded with the powder-based binder,</u>

wherein said inorganic coating (B)(II) and said pigment substrate (B)(I) of said color effect-providing pigment (B) interact with said first color effect of said substrate to produce said second color effect upon application of the film layer of the powder-based coating

composition to the substrate.[, and said inorganic coating and said pigment substrate of said color effect-providing pigment interact with said first color effect of the substrate such that said second color effect is different from said first color effect at least by ΔL 20.0, Δa 10.0, and Δb 15.0 as measured according to CIE Lab color space.]